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Search for Pair-Produced Resonances Each Decaying into at Least Four Quarks in Proton - Proton Collisions at $\sqrt{s} = 13$ TeV (Article) (Open Access)

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This Letter presents the results of a search for pair-produced particles of masses above 100 GeV that each decay into at least four quarks. Using data collected by the CMS experiment at the LHC in 2015-2016, corresponding to an integrated luminosity of 38.2 fb⁻¹, reconstructed particles are clustered into two large jets of similar mass, each consistent with four-parton substructure. No statistically significant excess of data over the background prediction is observed in the distribution of average jet mass. Pair-produced squarks with dominant hadronic R-parity-violating decays into four quarks and with masses between 0.10 and 0.72 TeV are excluded at 95% confidence level. Similarly, pair-produced gluinos that decay into five quarks are also excluded with masses between 0.10 and 1.41 TeV at 95% confidence level. These are the first constraints that have been placed on pair-produced particles with masses below 400 GeV that decay into four or five quarks, bridging a significant gap in the coverage of R-parity-violating supersymmetry parameter space. © 2018 CERN. for the CMS Collaboration. Published by the American Physical Society under the terms of the »https://creativecommons.org/licenses/by/4.0/« Creative Commons Attribution 4.0 International license. Further distribution of this work must maintain attribution to the author(s) and the published article' s title, journal citation, and DOI.

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